CLAIMS

What is claimed is:

1. A method for predicting the properties of a sedimentary deposit, the method comprising:

(a) determining at least one contour of constant deposit thickness in the sedimentary deposit;

(b) determining at least one fluid flow property at the inlet of the sedimentary deposit by using the constant deposit thickness contour;

(c) determining at least one property of the deposit for at least one point inside the sedimentary deposit by simulating the fluid flow.

2. The method of claim 1 wherein the fluid flow is simulated through numerical modeling by using the fluid flow properties at the inlet as a boundary condition.

3. The method of claim 1 wherein at least one flow property is selected from the group consisting of flow velocity, suspended sediment volume fractions, deposition time, flow height, and any combination thereof.

4. The method of claim 2 wherein at least one property of the deposit at any point is determined by simulating the fluid flow which built the deposit using information about the fluid flow properties at the inlet of the deposit obtained from a constant thickness contour of the deposit.

5. The method of claim 1 wherein at least one property of the deposit at any point is selected from the group consisting of the thickness of the sediment body, the size of the body, the shape of the body, the grain size distribution at each point within the body, median grain size, grain sorting, bedding type and any combination thereof.

6. The method of claim 1 wherein at least one flow property at the inlet is estimated by assuming the sediment volume fraction in each size bin supplied at the

inlet to be a known function of flow velocity and the function is determined by a method chosen from the group consisting of: empirical correlations, grain size measurements from nearby or related systems, computer simulation of the attributive system, provenance studies, and any combination thereof.

7.   The method of claim 1 wherein the contour of constant deposit thickness is the mapview outline of the deposit.

8   A method for predicting at least one deposit property at any location within a sedimentary deposit, the method comprising:

(a)   determining at least one contour of constant deposit thickness in a measured deposit;

(b)   determining an inlet point and end point for the measured deposit from the outline of constant deposit thickness;

(c)   creating a backbone curve connecting the inlet point and end point for the measured deposit and creating ribs perpendicular to the backbone;

(d)   estimating the flow properties at the inlet of the measured deposit;

(e)   simulating the flow properties and deposit properties corresponding to the estimated inlet flow properties;

(f)   determining the backbone and ribs of the simulated deposit;

(g)   repeating steps (d) through (g) until the rib lengths of the simulated deposit are substantially similar to the corresponding rib lengths of the measured deposit;

(h)   determining at least one deposit property along the ribs of the simulated deposit, and assigning at least one deposit property along the corresponding ribs of the measured deposit;

(i)   determining at least one deposit property in at least one point in the measured deposit based on at least one deposit property along the neighboring ribs.

9.   The method of claim 8 wherein the grain size distribution at any point inside the sedimentary deposit is determined by establishing grain size distributions along the ribs of the measured deposit, and interpolating the grain size distribution at any point inside the sedimentary deposit.

10.   The method of claim 8 further comprising determining the thickness at any point inside the sedimentary deposit by simulating at least one flow property.

11.   The method of claim 8 wherein the thickness of the deposit is determined by dividing the thickness at the measured thickness contour by the thickness at the calculated contour and multiplying the calculated thicknesses everywhere by this scale factor.

12.   The method of claim 8 further comprising extrapolating the deposit properties by extending the backbone and ribs of the measured and simulated thickness contours outside the contours.

13.   The method of claim 12 further comprising predicting the lateral extent of the deposit.

14.   The method of claim 8 wherein at least one flow property is selected from the group consisting of flow velocity, suspended sediment volume fractions, deposition time, flow height, and any combination thereof.

15.   The method of claim 8 further comprising determining the properties of the deposit at any point from simulating the fluid flow.

16.   The method of claim 15 wherein at least one property of the deposit at any point is selected from the group consisting of the thickness of the sediment body, the size of the body, the shape of the body, bedding type, and the grain size distribution at each point within the body, and any combination thereof.

17.   The method of claim 8 wherein at least one flow property at the inlet is estimated by assuming the sediment grain size distribution at the inlet to be a known function of flow velocity and the function is determined by a method from the group consisting of: empirical correlations, grain size measurements from related systems, computer simulation of the attributive system, provenance studies, and any combination thereof.

18.   The method of claim 8 wherein the outline of constant deposit thickness is the mapview outline of the deposit.

19.   The method of claim 8 wherein step (g) involves repeating steps (d) - (g) until both the rib lengths and the deposit thickness at the contour are substantially similar.